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Beliefs about the ability to control specific emotions

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Abstract
People hold divergent beliefs regarding the controllability of their emotions. These beliefs can refer to emotion, in general, or to a particular emotion. But are beliefs about particular emotions distinct and emotion-specific or do they capture one general construct? To address this question, in this investigation, we tested the emotion-specificity of such beliefs. In Study 1 ($N=244$), we assessed beliefs about the ability to control sadness, anger, and disgust, cross-sectionally. Beliefs about the ability to control specific emotions were associated but psychometrically distinct. As expected, beliefs about the ability to control a specific emotion were largely associated with experiences of that emotion at both the trait and state levels, although there was some overlap. In Study 2 ($N=157$), we tested beliefs about the ability to control sadness and irritation in daily life, over 7 daily diaries. As expected, beliefs about the ability to control a specific emotion were associated with the respective trait emotion, and prospectively and differentially predicted experiences of that emotion in daily life. These findings demonstrate that although there is some commonality across them, beliefs about the ability to control particular emotions are emotion-specific. Accordingly, to better understand the experience and regulation of specific emotions, it may be useful to assess beliefs about the controllability of those emotions, in particular.

Keywords Emotion · Emotion regulation · Implicit theories · Controllability

Introduction

People cultivate beliefs regarding the controllability of emotion (e.g., Tamir et al., 2007). Such beliefs have been associated with emotional, interpersonal, and clinical outcomes (e.g., Ford & Gross, 2019). They predict how people feel in a given moment (state emotion; e.g., Kappas & Schikowski, 2013), and their tendency to experience certain emotions over time (trait emotion; e.g., Schroder et al., 2015). These beliefs have been studied with reference to emotions in general (e.g., Tamir et al., 2007), one's own emotions (e.g., De Castella et al., 2013), or in reference to one particular emotion (e.g., anxiety: Schroder et al., 2019a, 2019b). It is therefore important to examine the extent to which beliefs about the controllability of emotion are emotion-specific. If such beliefs are emotion-specific, beliefs about the controllability of a particular emotion may be better suited to predict those specific state and trait emotions, allowing for greater accuracy in prediction and intervention. Our investigation, therefore, tackled this question.

Beliefs about the controllability of emotion

People cultivate beliefs about the controllability of human attributes (Dweck et al., 1995). More specifically, people endorse beliefs about the controllability of emotion across several dimensions. Some research has examined beliefs about the controllability of emotion in general (e.g., Ford et al., 2018; Kneeland et al., 2016; Romero et al., 2014; Tamir et al., 2007). Those who endorse more incremental beliefs about emotion believe that emotions are more amenable to control, whereas those who endorse more entity beliefs about emotion believe that emotions are less amenable to control (Tamir et al., 2007). People can also endorse beliefs about the controllability of their own emotions (e.g., De Castella et al., 2013). Finally, people can endorse beliefs about the controllability of specific discrete emotions, such as anxiety (e.g., De Castella et al., 2014; Schroder et al.,

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2015), happiness (e.g., Tullett & Plaks, 2016; Van Tongeren & Burnette, 2018), or empathy (e.g., Schumann et al., 2014).

Beliefs about the controllability of emotions are associated with state and trait emotion. With respect to state emotion, stronger beliefs that emotions can be controlled have been associated with more positive and less negative emotional experiences, both cross-sectionally (King & de la Rosa, 2019), and prospectively (Tamir et al., 2007). In contrast, people who believe that emotions are less amenable to control, have reported more discomfort while watching an aversive movie clip, and experienced more negative affect after the clip (Kappas & Schikowski, 2013). With respect to trait emotion, beliefs that one's own anxiety is less amenable to control have been associated with more symptoms of anxiety cross-sectionally (Schroder et al., 2015), and prospectively predicted higher weekly distress (Schroder et al., 2019a, 2019b). People with social anxiety disorder who believed their social anxiety is less controllable, have reported greater social anxiety (De Castella et al., 2014).

Beliefs about the controllability of emotions may shape emotion. For instance, believing that emotions are less controllable may prevent people from trying to control their emotions, leading them to experience more intense emotions that are undesirable. Consistent with this idea, the belief that emotions are more controllable at the beginning of the semester was associated with less depression at the end of the semester (Kneeland & Dovidio, 2019). Similarly, belief that emotions are controllable in youth were associated with less depression 18 months later (Ford et al., 2018).

Specificity of beliefs about the controllability of emotion

In general, beliefs about controllability are domain-specific (e.g., Dweck et al., 1995; Hughes, 2015). That is, beliefs about controllability in one domain (e.g., emotion) are distinct from beliefs about controllability in another domain (e.g., intelligence; Tamir et al., 2007). Such specificity does not necessary imply complete independence, as beliefs in one domain may be associated with beliefs in another domain. Beliefs about controllability within each domain may be positively associated to some extent, whereas beliefs about controllability across domains should be more weakly associated (Dweck et al., 1995). Indeed, beliefs about controllability of personal attributes, in general, were associated with beliefs about controllability of intelligence and morality, but not with beliefs about controllability of the world (Dweck et al., 1995).

Such specificity does imply differential predictive abilities, such that beliefs about controllability in a specific domain are likely to be predictors of outcomes in that domain, controlling for beliefs about controllability in another domain. This idea has received empirical support. In school, beliefs about the controllability of intelligence were associated with higher grades and higher likelihood of moving to advanced math courses over time, controlling for beliefs about the controllability of emotion (Romero et al., 2014). In contrast, beliefs about the controllability of emotion were associated with fewer depressive symptoms and higher likelihood of feeling better over time, controlling for beliefs about the controllability of intelligence (Romero et al., 2014). During the transition to college, beliefs about the controllability of emotion were associated with emotional experiences, controlling for the controllability of intelligence (Tamir et al., 2007).

Prior research has demonstrated that beliefs about the controllability of emotion are domain-specific and have differential predictive qualities. However, to date, the specificity of beliefs about the controllability of discrete emotions has received limited attention. There is some evidence that beliefs about the controllability of emotion in general are distinct from beliefs about the controllability of specific emotions. Beliefs about the controllability of anxiety, but not emotion, were specifically associated with mental health symptoms (e.g., problematic worry, social anxiety; Schroder et al., 2016). Participants diagnosed with social anxiety disorder were likely to believe that their anxiety was less controllable than their emotions in general, whereas the opposite pattern was true for healthy participants (De Castella et al., 2014).

There is also some evidence that beliefs about the controllability of specific emotions (vs. emotion in general) have differential predictive ability. People who believed they were less able to control their anxiety reported more symptoms of anxiety, depression, maladaptive perfectionism, and more interpersonal problems, controlling for beliefs about the controllability of emotion in general (Schroder et al., 2015). Similarly, among patients undergoing acute psychiatric treatment, beliefs that their anxiety was controllable (but not beliefs about the controllability of emotion in general) prospectively predicted fewer anxiety (but not depression) symptoms at discharge (Schroder et al., 2019a, 2019b).

These studies suggest that beliefs about the controllability of emotion in general may differ from beliefs about the controllability of specific emotions. However, differences may be due to the specificity of target emotions (e.g., anxiety vs. emotion), or the type of belief examined (e.g., beliefs about one's ability vs. general belief). In this investigation, therefore, we tested the emotion-specificity of beliefs about the controllability of one's own emotions. We expected beliefs about the ability to control one emotion to have a small to moderate association, yet be distinct from, beliefs about the ability to control another emotion. Furthermore, we expected beliefs about the ability to control a specific emotion to be more tightly associated with state and trait levels of that same emotion than with other emotions.

Learning about the specificity of beliefs about the controllability of emotions is important for several reasons. First, emotion-specific beliefs could shed light on emotion-specific outcomes. For instance, people who believe anger is less controllable may be more likely to get angry. Second, emotion-specific beliefs could shed light on specific antecedents. A person who believes that a specific emotion is less controllable may have had experiences that reaffirmed such beliefs. For instance, people who get angry often may come to believe that anger (but not another emotion) is less controllable, which in turn, might make them less likely to try to control their anger. Therefore, if they are emotion-specific, assessing beliefs about the controllability of a specific emotion could help identify, understand, and potentially treat difficulties in controlling that emotion.

The present investigation

We focused on beliefs about the ability to control unpleasant emotions, since people try to regulate them more often than positive emotions (e.g., Gross et al., 2006), and because they are linked to poorer mental health (e.g., Berking & Wupperman, 2012). To offer a more conservative test of our hypothesis, we compared beliefs about discrete unpleasant emotions that are similar in valence, arousal, or both. In Study 1, we assessed beliefs about the ability to control sadness, anger, and disgust. In Study 2, we assessed beliefs about the ability to control sadness and irritation, the latter being similar to anger in some respects, but more common in daily life.

In Study 1, which was a cross sectional-study, we first tested whether beliefs about the ability to control sadness, anger, and disgust, were associated yet psychometrically distinct. Second, we tested whether such beliefs were associated with their respective state and trait emotions, even when controlling for beliefs about the ability to control the other emotion. For example, we expected people's beliefs about their ability to control sadness to be associated with state and trait sadness, even when controlling for beliefs about their ability to control anger or disgust. In Study 2, which was a daily diary study, we tested whether such beliefs were associated with the experience of that emotion in daily life, and whether such beliefs were associated that emotion at the trait level, even when controlling for beliefs about the ability to control the other emotion.

Study 1

Study 1 was a cross-sectional survey, in which we examined the specificity of beliefs about the ability to control discrete unpleasant emotions: sadness, anger, and disgust.

Method[1]

Participants

Participants were 244 (74.6% male; $M_{age} = 23.36$, $SD = 3.35$) students. Seventeen additional participants failed attention checks (see Oppenheimer et al., 2009) and were omitted from the analyses. The survey was set up to prompt participants if they missed items, and therefore there were no missing data. Participants received ~ $6.50 (ILS 20) for their participation. Based on the conservative subjects-to-variables ratio of 1:20 for exploratory factor analysis (Hair et al., 1995), we set the desired sample size to 240 participants (4 items per scale * 3 scales * 20).

Procedure

Participants rated their state emotions in a randomized order. Next, they rated their beliefs about their ability to control each emotion in a counterbalanced order. Finally, they rated their trait emotion in a randomized order.[2]

Materials

Beliefs about the ability to control sadness, anger, and disgust To assess beliefs about the ability to control sadness, anger, and disgust, participants rated their agreement (*1* = strongly disagree; *5* = strongly agree) with four items. These items were adaptations of the items in the Implicit Theories of Emotion Scale (Tamir et al., 2007), targeting beliefs about one's ability to control emotions (e.g., De Castella et al., 2013), and adapted to the target emotions (the items are presented in Table 1). We reverse-scored two items in each scale and averaged across the items, so that higher scores reflect greater beliefs about the ability to control that emotion.

State emotions Participants rated (*1* = very little; *5* = very much) the extent to which they experienced various emotions right now. To assess state sadness, we averaged across *sadness* and *depression*. To assess state anger, we averaged across *anger* and *irritation*. To assess state disgust, we averaged across *disgust* and *nausea*.

[1] All the data reported in the present manuscript, as well as the Supplemental Materials, are publicly available via Open Science Framework, and can be accessed at: https://osf.io/4fk63/?view_only=932b3ecd5299483cb9dbd58ba5dd9979.

[2] Data in all studies were collected as part of larger studies designed to answer multiple research questions (see descriptions in Supplemental Materials). We only report variables relevant to this project.

Table 1 Factor loadings for exploratory factor analysis with Promax rotation of beliefs about the ability to control sadness, anger, and disgust scale items (Study 1; $N = 244$)

Scale	Item text	1	2	3
Disgust	If I want to, I can change my level of disgust	**−.85**	.02	.03
Disgust	No matter how hard I try, I can't really change my level of disgust. (R)	**.84**	−.01	.02
Disgust	I can learn to control my disgust	**−.80**	−.02	.04
Disgust	The truth is, I have very little control over how disgusted I feel. (R)	**.69**	−.02	.05
Anger	I can learn to control my anger	.05	**.85**	−.03
Anger	If I want to, I can change my level of anger	.02	**.82**	.04
Anger	No matter how hard I try, I can't really change my level of anger. (R)	−.02	**−.75**	−.06
Anger	The truth is, I have very little control over how angry I feel. (R)	.11	**−.66**	.08
Sadness	I can learn to control my sadness	.03	−.03	**.83**
Sadness	If I want to, I can change my level of sadness	−.02	.02	**.79**
Sadness	The truth is, I have very little control over how sad I feel. (R)	.00	.07	**−.72**
Sadness	No matter how hard I try, I can't really change my level of sadness. (R)	.02	−.08	**−.70**
% of Explained variance		32.4	24.4	13.9

Note. (R) represents reversed item. Factor loadings >|.50| are in boldface

Trait emotions AS a proxy for trait sadness, we used two items from the Center for Epidemiological Studies—Depression (CES-D; Radloff, 1977). These items were: "I felt sad" and "I felt depressed". Participants rated the frequency with which they experienced depressive symptoms during the past week (*1* = rarely or none of the time; *4* = most or all of the time). We averaged across the two items, so that higher scores represented higher tendency to experience sadness.[3]

To assess trait anger, participants completed the 10-item Trait Anger Scale (TAS; Spielberger et al., 1983). Participants rated each item in relation to how they 'generally feel' on a 4-point scale (*1* = almost never; *4* = almost always; e.g. "I have a fiery temper"). We averaged across items, so that higher scores represented higher tendency to experience anger.

To assess trait disgust, participants completed the 12 items concerning core disgust (Olatunji et al., 2007) from the disgust sensitivity scale (Haidt et al., 1994). Items were rated on a 5-point scale (*0* = not at all; *4* = extremely; e.g., "It would bother me to see a rat run across my path in a park"). We reverse-scored two items and averaged across all, so that higher scores represented higher tendency to experience disgust.

Results

First, we wanted to test whether beliefs about the ability to control sadness, anger, and disgust were psychometrically distinct. To this end, we conducted an exploratory factor analysis on the belief scales with Promax rotation in SPSS 21.0 (IBM Corporation, 2012). As expected and shown in Table 1, the analysis extracted three factors: beliefs about the ability to control disgust (Factor 1), anger (Factor 2), and sadness (Factor 3). This was determined by Eigenvalues > 1, explaining 70.6% of the total variance. All items loaded (<|0.50|) on their expected factor, with no substantial cross-loadings.

We then examined associations between the different beliefs. As shown in Table 2, there were small to moderate associations between the different belief scales.

Second, we tested whether beliefs about the ability to control one emotion were associated with the experiences of that emotion at the state and trait levels, even when controlling for beliefs about the ability to control another emotion. We conducted analyses in R (version 1.3.1093). We ran multiple regressions, in which predictors were grand-mean centered.

Sadness

We ran a multiple regression to test whether grand-mean centered beliefs about the ability to control sadness were associated with state sadness, when controlling for grand-mean centered beliefs about the ability to control anger and disgust (F [3, 240] = 8.90, $p < 0.001$, *Adj.* $R^2 = 0.09$). As predicted and shown in Fig. 1A and Table 3, the more people believed they could control their sadness, the less state sadness they felt. Beliefs about the ability to control anger and disgust were not associated with state sadness.

We ran similar analyses predicting trait sadness (F [3, 240] = 11.01, $p < 0.001$, *Adj.* $R^2 = 0.11$). As predicted and

[3] As another proxy for trait sadness, we also measured neuroticism. Analyses with neuroticism are reported in the Supplementary Materials.

Table 2 Descriptive statistics, internal reliabilities, and correlation of key variables (Study 1; $N = 244$)

#	Variable	*M*	*SD*	Possible range	Observed range	1	2	3	4	5	6	7	8	9
1	Beliefs about the ability to control sadness	3.51	0.90	1–5	1–5	(.84)								
2	Beliefs about the ability to control anger	3.85	0.86	1–5	1–5	.39**	(.85)							
3	Beliefs about the ability to control disgust	3.28	1.02	1–5	1–5	−.01	.08	(.87)						
4	State sadness	2.23	0.90	1–5	1–5	−.30**	−.16*	.09	(.74)					
5	Trait sadness	2.10	0.75	1–4	1–4	−.32**	−.12	.13*	.63**	(.81)				
6	State anger	2.19	0.93	1–5	1–5	−.24**	−.20**	−.01	.49**	.26**	(.84)			
7	Trait anger	1.87	0.53	1–4	1–3.7	−.25**	−.38**	−.10	.24**	.19**	.31**	(.85)		
8	State disgust	1.80	0.78	1–5	1–4.5	−.19**	−.02	−.01	.47**	.22**	.47**	.18**	(.62)	
9	Trait disgust	2.49	0.67	0–4	0.42–4	−.11	.01	−.22**	−.01	.07	.10	.24**	.20**	(.76)

Note. *$p < .05$, **$p < .001$. Internal reliabilities appear in the diagonal

shown in Fig. 1B and Table 3, the more people believed they could control their sadness, the less trait sadness they reported. Similarly, the more people believed they could control their disgust, the more trait sadness they reported. Beliefs about the ability to control anger were not associated with trait sadness.[4]

Anger

We ran a multiple regression to test whether grand-mean centered beliefs about the ability to control anger were associated with state anger, when controlling for grand-mean centered beliefs about the ability to control sadness and disgust (F [3, 240] = 5.95, $p < 0.001$, *Adj.* $R^2 = 0.06$; Table 3). Contrary to our prediction, beliefs about the ability to control anger were not associated with state anger. The more people believed they could control their sadness, the less state anger they felt. Beliefs about the ability to control disgust were not associated with state anger.

We ran similar analyses predicting trait anger (F [3, 240] = 15.68, $p < 0.001$, *Adj.* $R^2 = 0.15$). As predicted and shown in Fig. 1C and Table 3, the more people believed they could control their anger, the less trait anger they reported. Beliefs about the ability to control sadness and disgust were not associated with trait anger.

Disgust

We ran a multiple regression to test whether grand-mean centered beliefs about the ability to control disgust were associated with state disgust, when controlling for grand-mean centered beliefs about the ability to control sadness and anger (F [3, 240] = 3.39, $p = 0.019$, *Adj.* $R^2 = 0.03$; Table 3). Contrary to our predictions, beliefs about the ability to control disgust were not associated with state disgust. However, the more people believed they could control their sadness, the less state disgust they felt. Beliefs about the ability to control anger were not associated with state disgust.[5]

We ran similar analyses predicting trait disgust (F [3, 240] = 5.65, $p < 0.001$, *Adj.* $R^2 = 0.05$). As predicted and shown in Fig. 1D and Table 3, the more people believed

[4] We repeated these analyses using only the sadness item. Results remained unchanged, such that beliefs about the ability to control sadness were associated with state sadness (Estimate [SE] = −0.22 [0.08], *95% CI* [−0.37 to −0.07], $p = .004$), and with trait sadness (Estimate [SE] = −0.27 [0.06], 95% CI [−0.39 to −0.16], $p < .001$).

[5] Due to the low reliability of the state disgust scale, we repeated this analysis using only the disgust item. Results remained unchanged, such that beliefs about the ability to control disgust were not associated with state disgust [*Estimate (SE)* = −0.08 [0.05], *95% CI* [−0.18 to 0.03], $p = .151$).

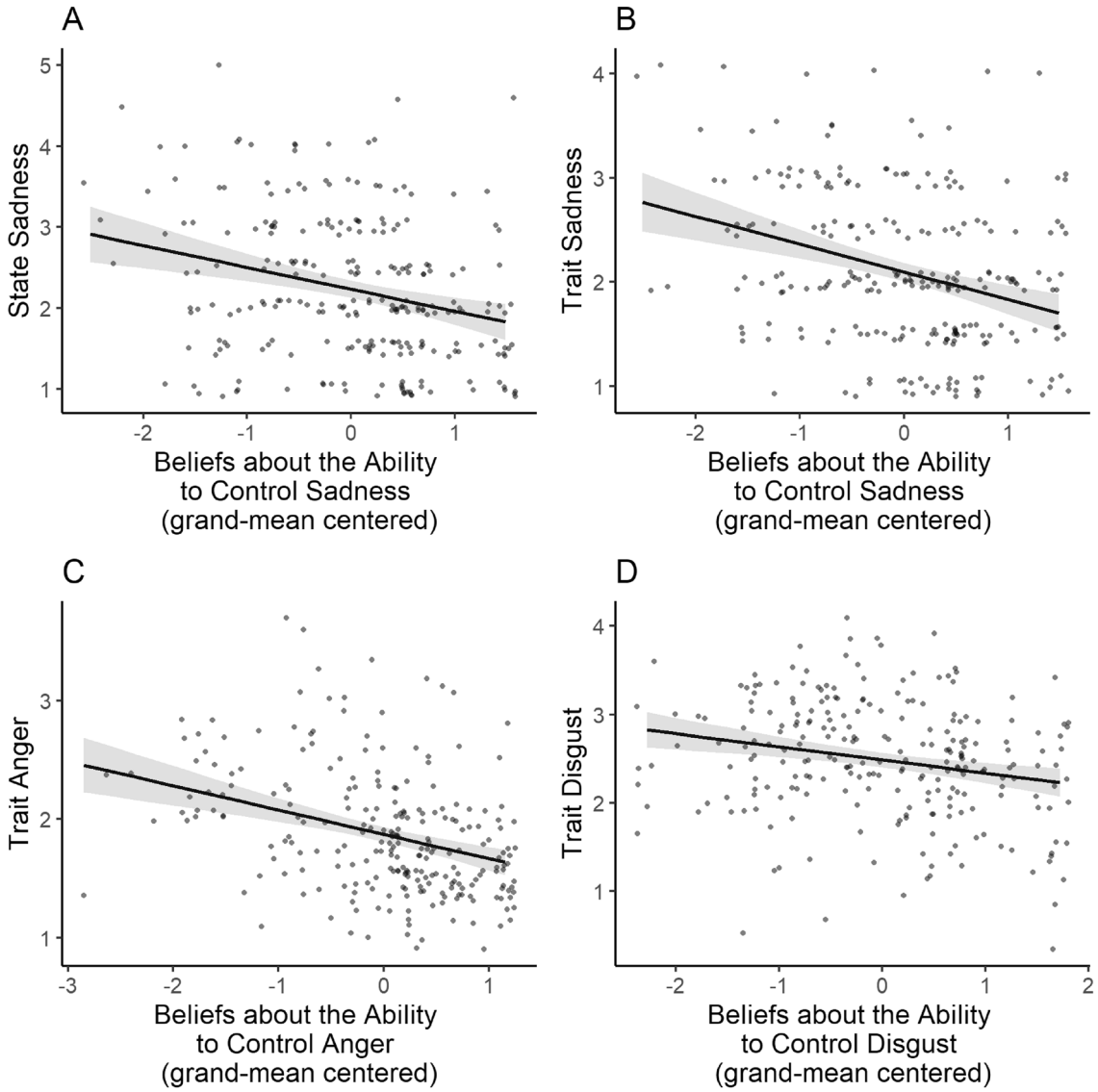

Fig. 1 The association between beliefs and state and trait emotion (Study 1; N = 244). To aid in interpretability, we plot the unstandardized effects. Shading represents the 95% confidence interval, and the scatterplot represents the daily observations

they could control their disgust, the less trait disgust they reported. Similarly, the more people believed they could control their sadness, the less trait disgust they reported. Beliefs about the ability to control anger were not associated with trait disgust.

Discussion

As expected, exploratory factor analyses revealed that beliefs about the ability to control sadness, anger, and disgust were psychometrically distinct. Some beliefs, but not all, were positively associated. We further predicted that beliefs about the ability to control a particular emotion would be associated with experiences of that emotion at the state and trait levels, when controlling for beliefs about the ability to control the other emotions. These predictions were supported in 4 out of 6 instances, with associations showing a medium effect size. There were a few exceptions, pertaining to associations with state emotions. Beliefs about the ability to control anger were not associated with state anger, and beliefs about the ability to control disgust were not associated with state disgust. It seems that beliefs about the ability to control an emotion were mostly associated with trait experiences of that emotion (but less so with state experiences of that emotion), when controlling for beliefs about other emotions.

We also examined whether beliefs about the ability to control one emotion are less strongly associated with, or not associated with, experiences of the other emotion, at the

Table 3 Results when predicting state and trait emotion using beliefs (Study 1; $N = 244$)

Emotional experiences				Beliefs about the ability to control:		
			(Intercept)	Sadness	Anger	Disgust
Sadness	State	Beta (SE)	−0.00 (0.06)	**−0.27 (0.07)**	−0.06 (0.07)	0.09 (0.06)
		Estimates (SE)	2.23 (0.05)	**−0.27 (0.07)**	−0.07 (0.07)	0.08 (0.05)
		95% CI	2.12–2.34	**−0.40 to −0.14**	−0.21 to 0.07	−0.03 to 0.19
		p	< .001	**< .001**	.332	.133
	Trait	Beta (SE)	−0.00 (0.06)	**−0.32 (0.07)**	−0.01 (0.07)	**0.12 (0.06)**
		Estimates (SE)	2.10 (0.05)	**−0.27 (0.05)**	−0.01 (0.06)	**0.09 (0.04)**
		95% CI	2.01–2.19	**−0.37 to −0.16**	−0.12 to 0.11	**0.00–0.18**
		p	< .001	**< .001**	.920	**.042**
Anger	State	Beta (SE)	−0.00 (0.06)	**−0.19 (0.07)**	−0.12 (0.07)	0.01 (0.06)
		Estimates (SE)	2.19 (0.06)	**−0.20 (0.07)**	−0.13 (0.07)	0.01 (0.06)
		95% CI	2.08–2.30	**−0.33 to −0.06**	−0.28 to 0.01	−0.11 to 0.12
		p	< .001	**.005**	.072	.930
	Trait	Beta (SE)	−0.00 (0.06)	−0.12 (0.06)	**−0.33 (0.06)**	−0.07 (0.06)
		Estimates (SE)	1.87 (0.03)	−0.07 (0.04)	**−0.20 (0.04)**	−0.04 (0.03)
		95% CI	1.81–1.93	−0.14 to 0.00	**−0.28 to −0.13**	−0.10 to 0.02
		p	< .001	.064	**< .001**	.231
Disgust	State	Beta (SE)	−0.00 (0.06)	**−0.22 (0.07)**	0.06 (0.07)	−0.02 (0.06)
		Estimates (SE)	1.80 (0.05)	**−0.19 (0.06)**	0.06 (0.06)	−0.02 (0.05)
		95% CI	1.70–1.89	**−0.31 to 0.07**	−0.07 to 0.18	−0.11 to 0.08
		p	< .001	**.002**	.376	.734
	Trait	Beta (SE)	−0.00 (0.06)	**−0.14 (0.07)**	0.08 (0.07)	**−0.23 (0.06)**
		Estimates (SE)	2.49 (0.04)	**−0.10 (0.05)**	0.06 (0.05)	**−0.15 (0.04)**
		95% CI	2.41–2.57	**−0.20 to −0.01**	−0.04 to 0.16	**−0.23 to −0.07**
		p	< .001	**.037**	.257	**< .001**

Note. Significant associations are bolded

state and trait levels. This was indeed the case in 8 out of 12 cases. There were a few exceptions. Specifically, beliefs about the ability to control sadness were associated with state and trait disgust and with state anger, and beliefs about the ability to control disgust were associated with trait sadness. It seems that although beliefs about the ability to control sadness were associated, as expected, with state and trait sadness, they were also associated to the same extent with other emotions. Beliefs about the ability to control disgust were associated, as expected, with trait disgust, but contrary to our prediction – not associated with state disgust, and at the same time associated with trait sadness. Exceptions pertained to associations with sadness, which might suggest that as a prototypical negative emotion, beliefs about sadness may reflect beliefs about unpleasant emotions, more generally.

Study 2

Study 2 extended Study 1 in several respects. First, Study 1 was a survey completed at a specific point in time, measuring what people were feeling as they completed the survey, and how they perceived their general emotional tendencies and beliefs about their ability to control specific emotions. Recall measures tend to produce higher ratings for emotions than daily diary ratings ("memory-experience gap"; Miron-Shatz et al., 2009). As such, recall measures are less informative regarding what people actually feel in daily life. To overcome this limitation, Study 2 was a daily diary study, examining these associations during people's daily lives. Examining specificity in daily life is important to move towards ecologically valid interventions.

Second, in Study 1 we examined the association between beliefs about the ability control an emotion and state and trait emotional experiences cross-sectionally. Therefore, in Study 2, we tested prospective associations between beliefs and state emotions over time. Third, whereas in Study 1 we assessed beliefs about the ability to control sadness, anger, and disgust, in Study 2 we assessed beliefs about the ability to control sadness and irritation. Given that in Study 2 we tracked emotions in daily life, where time constraints are of the essence, we focused on two frequently regulated daily emotions—namely, sadness and irritation (e.g., Gross et al., 2006). We chose sadness again, since its respective beliefs were associated with both state and trait sadness, to further

examine its beliefs specificity in daily life. Instead of anger (which was assessed in Study 1), we opted to assess irritation, as it is somewhat similar in content, but tends to be experienced more frequently in daily life. We did not assess disgust in Study 2, as it is relatively infrequent in daily life (Gross et al., 2006).

Method

Participants

We recruited 157 participants through Prolific ($M_{age}=36.15$, $SD_{age}=11.75$; 74.5% female). Nine additional participants were excluded, because they completed less than 50% of the study.[6] No participants were omitted from the analyses for failing to pass attention checks, and the survey was set up to prompt participants if they missed items, and therefore there were no missing data. Participants received up to $9.57 for participation. This was part of a larger study, where sample size was determined by other considerations. Multilevel models are limited more by the number of participants than by the number of time points (Bolger & Laurenceau, 2013), and so calculating power at the person-level gives an estimate of the needed power. Using G*Power 3 (Faul et al., 2007), the obtained sample size of 157 allowed us to detect an effect size of $r=0.22$ or higher, at a significance level (α) of 0.05, with 0.80 power (1-β).

Materials

Beliefs about the ability to control sadness and irritation Participants rated the same items as in Study 1, with respect to sadness and irritation. To decrease ambiguity, the scales directly assessed beliefs about the ability to decrease (rather than control) sadness or irritation ($\alpha=0.88$, and 0.87, respectively; results of a factor analysis are reported in the Supplemental Materials).

State emotions Participants rated how much they felt various emotions (*0* = not at all; *100* = very much) right now. To assess state sadness, we averaged across the items *sadness* and *depression* ($\omega_{between}=0.95$, $\omega_{within}=0.78$). To assess state irritation, we averaged across the items *irritation* and *annoyance* ($\omega_{between}=0.98$, $\omega_{within}=0.84$).

Trait emotions To assess trait sadness, we used the same items that were assessed in Study 1 ($\alpha=0.83$). To assess trait irritation, participants indicated (*0* = not at all; *100* = very much) how *irritated* and *annoyed* they felt, in general ($\alpha=0.91$).

Procedure

The study included a baseline assessment, and 7 daily diaries. At baseline, participants rated their beliefs about their ability to control irritation and sadness, as well as their trait irritation and sadness. Over seven days, participants were e-mailed the daily survey at 19:00, and could complete it by noon the following day. In the daily assessments, participants rated their daily experiences of irritation and sadness[1,2].

Results

First, we examined associations between the different beliefs. As shown in Table 4, the two scales were related, with positive and small to moderate associations.

Second, we tested whether beliefs about the ability to control sadness and irritation were associated with daily experiences and trait-level of these emotions, even when controlling for beliefs regarding the other emotion. We conducted analyses in R (version 1.3.1093). For both state and trait emotions, we controlled for beliefs about the ability to control the second emotion, in order to show specificity. For state emotions, we ran multilevel models (measurement occasions nested within participants), using lme4 (Bates et al., 2015), with *p*-values calculated using lmerTest (Kuznetsova et al., 2013). We included random intercepts for participants and random slopes for any daily predictor. Person-level predictors were grand-mean centered, so higher scores indicate higher levels of that variable for an individual, compared to other individuals. For trait emotions, we ran multiple regressions, in which predictors were grand-mean centered.

Sadness

We ran a multilevel model to test whether grand-mean centered beliefs about the ability to control sadness were associated with state sadness, controlling for grand-mean centered beliefs about the ability to control irritation at baseline. As predicted and shown in Fig. 2A and Table 5, the more people believed they could control their sadness, the less sadness they felt in their daily lives. Beliefs about the ability to control irritation were not associated with daily sadness or with sadness on the previous day.

We ran a multiple regression to test whether grand-mean centered beliefs about the ability to control sadness were

[6] The 9-day study included a pre-diary assessment, 7 days of diaries, and a post-diary assessment. Of the original 166 participants, 70.5% completed all 9 days, 7.8% completed 8 days, 6.6% completed 7 days, 5.4% completed 6 days, and 4.2% completed 5 days. Nine participants (5.4%) completed 4 days or less, and thus were excluded from the analyses. Participants completed on average 8.16 surveys ($SD=1.58$).

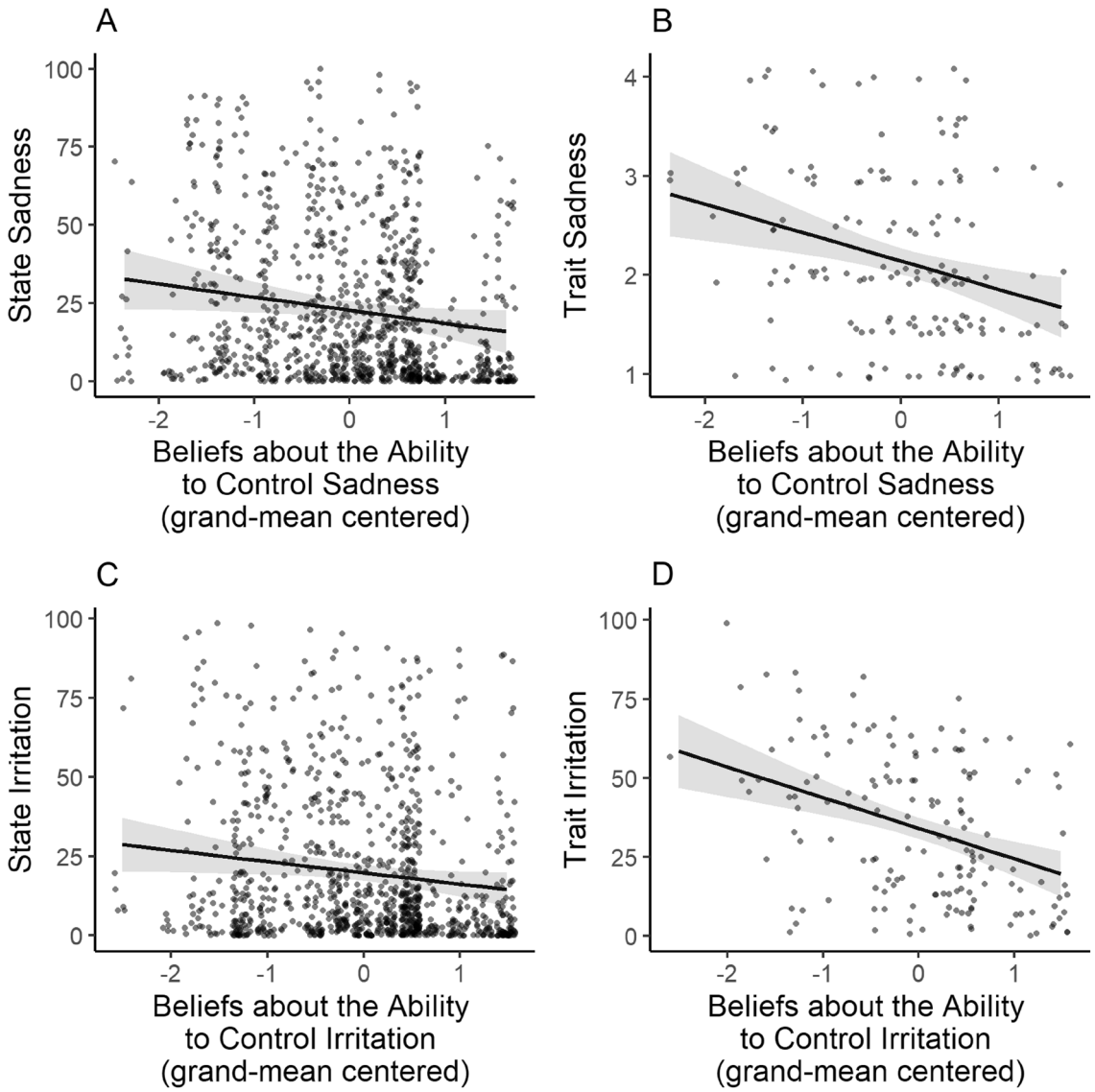

Fig. 2 The association between beliefs and state emotion (Study 2; N = 157). To aid in interpretability, we plot the unstandardized effects. Shading represents the 95% confidence interval, and the scatterplot represents the daily observations

associated with trait sadness, when controlling for grand-mean centered beliefs about the ability to control irritation. As predicted and shown in Fig. 2B and Table 5, the more people believed they could control their sadness, the lower their trait sadness. Beliefs about the ability to control irritation were not associated with trait sadness.[7]

[7] We repeated these analyses using only the sadness item. Results remained unchanged, such that beliefs about the ability to control sadness were associated with state sadness [*Estimate (SE)* = −7.41 (1.02), *95% CI* (−9.41 to −5.42), $p < .001$], and with trait sadness [*Estimate (SE)* = −0.26 (0.09), *95% CI* (−0.44 to −0.09), $p = .004$].

Irritation

We ran a multilevel model to test whether grand-mean centered beliefs about the ability to control irritation at baseline were associated with state irritation, controlling for grand-mean centered beliefs about the ability to control sadness at baseline. As predicted and shown in Fig. 2C and Table 5, the more people believed they could control their irritation, the less irritated they felt in their daily lives. Beliefs about the ability to control sadness were not associated with daily irritation. The more people felt irritation on the previous day, the less irritated they felt in their daily lives.

We ran a multiple regression to test whether grand-mean centered beliefs about the ability to control irritation were

Table 4 Descriptive statistics, and correlation of key variables (Study 2; $N = 157$)

#	Variable	M	Within person SD	Between person SD	*ICC*	Possible range	Observed range	1	2	3	4	5
1	Beliefs about the ability to control sadness	3.39	NA	0.92	NA	1–5	1–5	1				
2	Beliefs about the ability to control irritation	3.53	NA	0.90	NA	1–5	1–5	.54**	1			
3	State sadness	22.63	12.27	19.53	0.60	0–100	0–100	−.25*	−.21*	1		
4	Trait sadness	2.13	NA	0.90	NA	1–4	1–4	−.35**	−.26*	.68**	1	
5	State irritation	19.89	15.11	16.04	0.37	0–100	0–98.49	−.19*	−.25*	.70**	.39**	
6	Trait irritation	33.94	NA	23.38	NA	0–100	0–99.04	−.30**	−.43**	.52**	.43**	.59**

Note. *$p < .05$, **$p < .001$

Table 5 Results when predicting state and trait emotion using beliefs (Study 2; $N = 157$)

Emotional experiences			(Intercept)	Beliefs about the ability to control sadness	Beliefs about the ability to control irritation
Sadness	State	Beta (SE)	0.01 (0.06)	**−0.16 (0.07)**	−0.09 (0.07)
		Estimates (SE)	22.75 (1.51)	**−4.19 (1.94)**	−2.32 (2.00)
		95% CI	19.79–25.70	**−7.99 to −0.38**	−6.23 to 1.59
		p	<.001	**.033**	.247
	Trait	Beta (SE)	0.00 (0.07)	**−.29 (0.09)**	−10 (0.09)
		Estimates (SE)	2.14 (0.07)	**−0.29 (0.09)**	−0.10 (0.09)
		95% CI	2.01–2.28	**−0.46 to −0.12**	−0.28 to 0.08
		p	<.001	**<.001**	.260
Irritation	State	Beta (SE)	0.01 (0.05)	−0.06 (0.06)	**−0.14 (0.06)**
		Estimates (SE)	19.84 (1.23)	−1.62 (1.58)	**−3.54 (1.62)**
		95% CI	17.43–22.25	−4.72 to 1.48	**−6.73 to −0.36**
		p	<.001	.308	**.031**
	Trait	Beta (SE)	0.00 (0.07)	−0.10 (0.09)	**−0.37 (0.09)**
		Estimates (SE)	34.17 (1.69)	−2.52 (2.18)	**−9.70 (2.24)**
		95% CI	30.83–37.52	−6.82 to 1.79	**−14.13 to −5.27**
		p	<.001	.250	**<.001**

Note. Significant associations are bolded

associated with trait irritation, when controlling for grand-mean centered beliefs about the ability to control sadness. As predicted and shown in Fig. 2D and Table 5, the more people believed they could control their irritation, the lower their trait irritation. Beliefs about the ability to control sadness were not associated with trait irritation.

Discussion

We predicted that beliefs about the ability to control a particular emotion would be associated with experiences of that emotion at the state and trait levels in daily life, when controlling for beliefs about the ability to control the other emotion. All of our predictions were supported. Specifically, people who believed they were better able to control their sadness experienced less sadness in daily life and reported lower trait sadness, when controlling for beliefs about the ability to control irritation. Associations with state emotion where weak, and associations with trait emotion were moderate. We found the same pattern with respect to beliefs about the ability to control irritation. We also examined whether beliefs about the ability to control a particular emotion were less strongly associated or not associated with experiences of the other emotion in daily life and at

the trait level. We found this pattern in all four cases. These associations showed specificity with respect to state and trait emotion in daily life.

General discussion

In this investigation, we tested the specificity of beliefs about the controllability of emotions. As expected, beliefs about the ability to control specific emotions (i.e., sadness, anger, and disgust in Study 1, and sadness and irritation in Study 2) emerged as psychometrically distinct in exploratory factor analyses, with some of them were positively associated. Furthermore, beliefs about the ability to control a target emotion were moderately associated with trait emotion in all instances (Studies 1–2), and weakly associated with state emotion in most instances, with the exception of state anger and state disgust (Study 1). In Study 1, specificity was evident in most cases, although beliefs about the ability to control sadness was related to experiences of emotions other than sadness, and beliefs about the ability to control disgust was also related to trait sadness. In Study 2, specificity was evident in all cases. Taken together, this investigation provides some support for the emotion-specificity of beliefs about the ability to control emotions.

Theoretical and applied implications

Beliefs about the controllability of emotion predict whether people regulate emotions (e.g., Schumann et al., 2014), and how people regulate emotions (e.g., Kneeland et al., 2016). They also predict state (e.g., Kappas & Schikowski, 2013) and trait (e.g., Schroder et al., 2015) emotions. Given the potential impact of such beliefs, it is important to know how specific they are. Some research has addressed this, comparing beliefs about the controllability of emotion in general to beliefs about the controllability of specific emotions. Such research has shown that these types of beliefs are distinct (e.g., De Castella et al., 2014), and have differential predictive power (e.g., Schroder et al., 2019a, 2019b). These findings highlight the importance of assessing beliefs about specific emotions. However, they do not indicate whether beliefs about the controllability of a specific emotion differ from beliefs about the controllability of another specific emotion. Our investigation, therefore, is the first to directly test whether beliefs about the controllability of emotions are emotion-specific.

To offer a more conservative test of this question, we compared beliefs about similarly-valenced emotions. First, we found that beliefs about the ability to control specific emotions were positively associated, but psychometrically distinct. This suggests that beliefs about the ability to control a specific emotion might not necessarily reflect beliefs about the ability to control another emotion. For example, people who struggle more (vs. less) with anger management may believe that their anger is less controllable, but they may not necessarily believe that their sadness is less controllable. Second, we found that beliefs about the ability to control a particular emotion was largely a better predictor of the respective state and trait emotion than were beliefs about the ability to control a different emotion. For example, beliefs about the ability to control irritation might be more relevant to predicting the likelihood of feeling irritated than beliefs about the ability to control sadness. Taken together, the findings of the present investigation support the idea that beliefs about the controllability of emotions are emotion-specific.

This investigation also has applied contributions. Our findings suggest that to motivate people to regulate a particular emotion, it may be useful to design interventions that cultivate beliefs about the ability to control that particular emotion. For example, if we want to encourage people with anger management issues to try to down-regulate their anger, it may be necessary to help them cultivate the belief that anger, in particular, can be controlled.

Limitations and future directions

The present investigation has several limitations. First, although most of the findings point to emotion-specificity of beliefs about controllability, this was not always the case. When measured cross-sectionally (Study 1), beliefs about the ability to control a specific emotion were not always uniquely associated with state emotion, and associations were weak. When measured prospectively (Study 2), associations with state emotion were significant, but weak. How people feel in one particular moment may be influenced more heavily by contextual factors, whereas trait emotions and state emotions that are aggregated over time are more likely to reflect stable affective dispositions. Therefore, to the extent that beliefs about the controllability of an emotion are associated with experiences of that emotion, such associations are likely to be more pronounced when assessing trait emotions and state emotions aggregated over multiple situations; future research should directly test this hypothesis.

Second, in the present investigation we used two proxies for trait sadness. The first was based on two items from the Center for Epidemiological Studies—Depression (CES-D; Radloff, 1977) that focused on experiences of sadness. The second was a neuroticism scale. As expected, both measures were associated with beliefs about the ability to control sadness in both studies, and emotion-specific (associated with sadness, but not irritation) in Study 2. Contrary to our prediction, the measures were not emotion-specific in Study 1: the two items from the CES-D were also associated with beliefs about the ability to control disgust, but not anger, whereas neuroticism was also associated with beliefs about

the ability to control anger, but not disgust. In addition, beliefs about the ability to control sadness in Study 1 were associated with state and trait sadness, state and trait disgust, and state anger. One possibility that could be addressed in future research, is that sadness is considered a prototypical negative emotion, and therefore, a proxy for emotions and beliefs about unpleasant emotions more generally.

Third, it is not yet clear why beliefs about the ability to control specific emotions are associated with experiences of that emotion. One possibility is that beliefs about the ability to control specific emotions propel state and trait emotion. The more people believe they can attain a goal, the more likely they are to engage in goal pursuit, which in turn increases the likelihood of successful goal attainment (e.g., Atkinson, 1957). Attainability of emotion regulation goals is informed by beliefs about one's ability to regulate emotions (Tamir, 2021). According to this account, stronger beliefs that an emotion can be controlled, could lead to greater engagement in emotion regulation, which would ultimately change the experience of that emotion (e.g., Ford et al., 2018). Another possibility is that beliefs about the controllability of emotions may be shaped by emotion. For instance, people who tend to experience more intense emotions may be less likely to believe that emotions are controllable. Consistent with this idea, people with higher rates of psychopathology at the beginning of the school year, came to believe that emotions are less controllable throughout the year (Schleider & Weisz, 2016). Consistent with both accounts, increases in the belief that emotions are controllable during college were associated with increases in the use of cognitive reappraisal as a means to control emotions, and this association was bi-directional (Gutentag et al., 2020). Future research could explore the possibility of a positive feedback loop between beliefs about the controllability of specific emotions and emotional experiences. Other research could test the potential mechanism associating beliefs and experiences by manipulating one and assessing potential changes in the other.

Fourth, it might be that beliefs about the ability to control specific emotions are associated with other beliefs, such as beliefs about the perceived value of that emotion (e.g., Ford & Gross, 2019). The more controllable an emotion is, the more likely people are to view it as valuable, and vice versa. Future research could assess the associations between beliefs about the ability to control specific emotions and beliefs about the perceived value of those emotions.

Fifth, the present investigation focused on beliefs about the ability to control several discrete negative emotions (sadness, anger/irritation, and disgust). We expect the findings to generalize to other emotions, both negative (e.g., anxiety, see Schroder et al., 2016), and positive (e.g., empathy, see Schumann et al., 2014). For example, beliefs about the controllability of anxiety have been found to be uniquely associated with problematic worry and social anxiety (Schroder et al., 2016), although its specificity with respect to other beliefs about the controllability of emotion remains to be tested.

Sixth, sometimes acknowledging that a specific emotion cannot be controlled may be more adaptive than trying to change it (see Hayes et al., 2012). In these cases, weaker (instead of stronger) beliefs about the ability to control specific emotions could potentially be associated with better (rather than worse) clinical outcomes. Future research could directly explore this possibility. Seventh, Study 2 was a daily diary study, allowing us to better monitor emotions as they are experienced across a week in daily life. Nonetheless, we did not sample several timepoints in a given day, assessing emotion across longer time spans (e.g., two-weeks, a month). Future research can examine the replicability of our findings using momentary experience sampling methods and over longer periods, to get a more granular assessment of emotion. Finally, as this was a secondary data analyses on data collected as part of larger studies designed to answer multiple research questions, future research should try to replicate our findings using primary and pre-registered data analyses.

To conclude, our investigation provides support for the specificity of beliefs about the controllability of emotions. Beliefs about controllability of specific emotions were associated yet distinct, and there was evidence in some cases for differential associations with state and trait emotion. Our findings indicate that to predict or potentially modify a particular emotion, it is important to examine beliefs about the controllability of that particular emotion.

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Data availability All the data reported in the present manuscript, as well as the Supplemental Materials, are publicly available via Open Science Framework, and can be accessed now at: https://osf.io/4fk63/?view_only=8c387424ca4e460ba5aff88685721f99.

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